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VOLUME XLIV NOVEMBER, 1945 NUMBER 8

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Professor DUDLEY STAMP, *London School of Economics,* in the *Geographical Review,* April, 1945

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Dr. Russell is Professor of Physical Geography, Head of the Department of Geography, and Assistant Director of the School of Geology, Louisiana State University. His best known works have been in climatology and geomorphology. For school children he has written *The Mississippi River*, a booklet intended for Louisiana sixth-graders that has found its way to widespread audiences among children of all ages.

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Miss Phillips is head of the high school department of geography, New Kensington, Pennsylvania, and a graduate of the University of Pittsburgh, where she is continuing her study for the doctorate. Her first paper appeared in September, and this is one of the units which she has developed. This is the fifteenth article in our series on secondary school geography.

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Miss Anderzhon teaches in the Horace Mann Junior High School, Oak Park, Illinois, and is a member of the Editorial Board of the *Illinois Bulletin of Geography*. She did her graduate work at the University of Chicago and Harvard. This is the second in a series of four units which Miss Anderzhon has prepared for the JOURNAL.

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POST-WAR GEOGRAPHY

RICHARD JOEL RUSSELL
Louisiana State University

The public has become extremely geography conscious during the war years. Geographers have enjoyed unprecedented employment opportunities. Their talents have been exhibited in circles hardly aware of their existence less than five years ago. An increased emphasis on geography in school curricula is already evident and everyone expects the movement to gain momentum. The fond hope of geographers, that our subject be viewed in the perspective of its real value, has been realized.

With widespread acceptance of geography as an expanding educational field comes the geographer's greatest challenge. Can we meet it successfully? Five or ten years from now will the demand for geographers greatly outshadow that of five or ten years ago? Will recent gains be held, our position strengthened, or will geography slip back to its marginal position in high school and college curricula and its traditional place in grade schools? The answers to these questions will depend on what geographers do in the immediate future. Our record in the past is not one to inspire confidence. It is timely that we make a frank survey of past mistakes and begin to plan soundly for the future.

DEMAND FOR GEOGRAPHY IS OLD

Geography was one of the earliest interests of literate man. The tradition of Herodotus, the study of peoples and places, has found champions in every age. The scholar of post-Columbian days ordinarily chose to be pictured with a globe at his side. Nor has respect for geography decreased during modern times. Public need for the field has been demonstrated many times by the way that schools have admitted it to their curricula.

In spite of public demand and the fact that every grammar

school graduate has spent several years studying the subject, it is shocking to hear an almost universal inability to answer even extremely simple geographical questions by contestants on radio-quiz programs, including those on the most scholarly level. This performance is not the fault of the subject, it is mainly the product of poor presentation. In return for liberal space in their instructional programs, geographers have given the schools such ill-conceived arrangements, so many fruits of fad, and such broad excursions into disciplines far removed from the core of the subject that many have come to question the reality of the field as an academic discipline.

ILL-CONCEIVED ARRANGEMENTS

To an older generation geography became boundaries, capitals, rivers, capes, and straits. The idea of rôte was somehow more closely identified with geography than with the kings, presidents, generals, wars, and dates of history. Practically everyone despised the subject.

With shifting emphasis from out-and-out place geography came organization on a political basis. After a descriptive survey of Great Britain and Ireland the student would likely be led to Canada, Australia, New Zealand, South Africa, India, and Jamaica. A return to Europe might bring him to France, but he would soon depart to Algeria, Senegal, Indo-China, and possibly to a few islands in the Pacific, or off the coast of North America. Little concept of the world could be gained from a procedure not unlike that of examining a painting according to the extremely logical plan of taking up all colors in spectral order.

In higher academic circles came the feeling that the true key to geography lay in climates. After following a naturalist along the Amazon the student was led to the Guinea coast, back into the Congo basin, to Sumatra, and all other areas of tropical rain forest. He then went to the tall grass, big game, and sharply seasonal savanna, from the Orinoco, across the Sudan, to the rice paddies of the Orient, and from thence to all deserts, to all steppes, or to all warm, but not too warm, places where rain falls in all months of the year. The emphasis was likely to be on physical geography, with comments as to distribution of vegetation, soils, and various other forms. Students again developed no widespread admiration for geography, nor did they grasp its essentials. They were being subjected to instruction somewhat equivalent to learning in detail the

operation of a carburetor or differential by a person who has never seen an automobile.

The Fruits of Fad

Under the guidance of William Morris Davis, a prophet superbly endowed with gifts of eloquence and logical expression, arose a tidal wave of enthusiasm for physical geography. Universities began to recognize the subject and it soon found its way into high schools, even in small communities. After a few astronomical and geometrical skirmishes with the field of space relations, where the student at least became impressed with the difficulty of computing time across the International Date Line, came physical matters involving such items as the difference between absolute and relative humidity, the identification of at least three types of clouds, something about cyclones and storm tracks, and a heavy dose of erosion, which flattened, or really almost flattened, the entire earth's surface. The almost-flats were then lifted high above the level of the sea and the whole process repeated itself. An elaborate terminology developed to plague specialists. In time many came to realize that this strict discipline was rather artificial stuff that had little connection with geography. Geologists and geographers either claimed it as their own, or gladly passed it on to the other. Administrators who had admitted it to their curricula generally developed a strong conviction that physical geography deserved no place in the reference frame of sound education. Dropping of courses in the subject became general in high schools. In colleges the field was gradually broken down into component parts and in many instances passed on to such departments as physics and geology.

Realization that geography should have more to offer than hanging valleys, eskers, and shorelines of emergence stimulated the rise of a competitive field, commercial geography. It was inclined to inventory the wheat, barley, oats, potatoes, rice, beef, coal, iron, etc., output of countries, "as of" some critical date, such as 1914, and wind up with something about railroads and merchant marines. Seldom did the teacher or student know where to find current data, or how to match them against tables in the text if found. There was comparatively little traditional geography in such courses, except the old rôte of place geography, which failed to enhance admiration of the subject in the minds of students. It

seemed to smack of the practical, however, so that books containing everything from physical geography to agricultural economics began masquerading under "commercial" and "economic" titles.

To balance the inanimate character of physical geography came the anthropocentric environmentalism of Ellen C. Semple, who successfully preached the gospel of Ratzel to the American educational world. Geography took the tack of "tell me where you live and I'll tell you what you are." Tropical sun darkened the skin of the Negro while overcast skies blonded the hair and blued the eyes of the Swede. The dark-skinned Eskimo was left out of that particular series but appeared elsewhere, at the bone-awl end of a progression that led to the mills of Manchester and Leeds. Geographers gaily sped off into questions of physiology, nutrition, psychology, sociology, and other fields, where they ordinarily met with stern rebuffs. Many regarded it as a birthright that geographers might harvest crops they had neither planted nor tended. The most serious result of the environmentalism fad has been a general discrediting of geography. Scientists began to regard the subject as a pseudo-science and social scientists feared it as an undisciplined catch-all that recognizes no academic boundaries.

TODAY'S FADS

Military and political strategy, matters of world or national economy, and planning of all types are not primary concerns of the geographer. He should be ready to provide much factual information to persons engaged in such activities and he may make the choice of becoming a specialist in one such field, but in doing so he should recognize his departure from geography itself.

Teachers and contributors to knowledge are undoubtedly needed in agricultural and other branches of economics, rural and other kinds of sociology, geopolitics and other forms of political science, public welfare, and kindred subjects. Geographers may have excellent backgrounds for entering such disciplines. There is real harm, however, when they insist that such disciplines enter geography. Fantastic claims for the content of geography have convinced many educators that the subject deserves no place in any curriculum.

From the perspective of future appraisal, every departure of geography from its traditional field of studying the earth and its inhabitants is likely to be regarded as a fad. Every time a geographer undertakes the work of specialists in other branches of knowl-

edge he runs the risk of placing himself in the position of extreme environmentalists who attacked complex physiological problems without benefit of training in such subjects as parasitology, genetics, or medicine in general. Trespassing into fields occupied by others is always dangerous and rarely results in enthusiastic reception.

What seems to be a rather widespread belief that the airplane has revolutionized geography and cartography is probably the most glaring admission of ignorance about these subjects in vogue today. Will thirst for fads lead us to the super-redundancy, "A global geography of the world?"

If the discovery of polar projections revolutionized geography, the trick was done before the start of the Christian Era, by Thales and Hipparchus. Those who believe that the last few years have brought revolutionary advances to cartography should be reminded that as an aid for finding the Northwest Passage, Sir Humphrey Gilbert used a polar projection in 1582, and that a San Francisco architect won a prize for a modified polar projection used for charting the course of an "around the world" airplane race to the World's Fair of 1915. As a matter of fact, few atlases published during the last four centuries have failed to include maps on one or two polar projection grids.

Much of the "new" cartography is extremely crude and misleading. Publisher's claims are commonly refuted by the maps themselves. It is obvious, for example, that on a North Pole-centered map the perfectly straight, great circle, equator has to look like a circle and so the shortest air route between two equatorial points will not be the straight-line chord between them. It is also true that the shortest line between Panama and Tokio, or Detroit and Berlin, is straight only in case the projection is gnomonic, and it doesn't matter whether it is a polar gnomonic or not. Northern hemisphere polar projections confuse shortest lines in the southern hemisphere in an atrocious manner and distort shapes far worse than most of the projections they are supposed to displace during this "air-age." Neither the airplane nor aerial photography has solved the cartographer's original dilemma, which is equivalent to squaring the circle, the possibility of a perfect map.

Perspective diagrams, however clever, are not maps. They are extremely complicated to make and difficult to interpret because they lack constant scale, and for that reason are highly deceptive.

THE CORE OF GEOGRAPHY

The central theme, or core, of geography has always been and always will be the study of the earth's surface. Even if the word "geography" eventually comes to mean human ecology, the reaction of man to environment, or something else, there will always be a discipline concerned primarily with the earth's surface.

That the field of geography is so broad that some specialize in such analytical undertakings as exploration, measurement, and description, while others synthesize subject matter under several different headings, is not denial of the reality of the discipline. The importance of the field is not weakened by the fact that it grades imperceptibly into such subjects as physics, geology, biology, demography, sociology, economics, and history. It is far more fruitful to identify the core of a subject than to attempt to define its outer boundaries.

Herodotus followed the core of geography, as did Strabo several centuries later. Each set out to describe the earth and its inhabitants and to draw significant conclusions from their examinations. Men have always been interested in that subject and always will be. The domain of the geographer has expanded vastly since the time of the Ancients but the central theme of the subject has remained the same. Paths divergent from the core have led to many fields now established permanently under other names. The whole growth and subdivision of knowledge into fields today is so complex that most paths diverging from the central theme of any ancient branch of learning lead into disciplines preëmpted by others.

The interest of the geographer in peoples arises primarily because they occupy and profoundly affect the surface of most parts of the earth. Yet the presence of man is not a necessity in defining the central theme of geography. Few will deny that there is a geography of Antarctica because that continent is uninhabited. The boundary of geography is not reached where the environment ceases to act on man, or man on the landscape.

The boundary of geography is not reached at any particular date in history. We need the services of the geologist, who may lead us back in time for profound distances, in order that we may understand today's earth's surface. Biologists assist us not only with regard to today's distribution of plants and animals but also in understanding their presence. We must accompany the prehistorian in search of answers to many specific landscape questions.

We must understand kaleidoscopic designs and changes in patterns of peoples who formerly occupied the places we are concerned with. Our interest is not primarily in geology, biology, anthropology, archeology, or history in such ventures. We need backgrounds that extend deep in time for explaining matters lying directly along the central theme of geography.

Departures from the Central Theme

Departures from the central theme of geography are not necessarily unproductive or bad. One of the earliest resulted in the birth of history as a branch of knowledge. It diverged from the tradition of Herodotus and Strabo by placing great emphasis on chronological sequence, becoming more concerned with dates, individuals, and evolution of movements than with places. Other departures have resulted in a host of extremely useful disciplines, ranging from such sister sub-sciences as oceanography, climatology, pedology, zoögeography, certain kinds of ecology, vulcanology, glaciology, and cartography to such sister social sciences as ethnography, demography, many parts of sociology, several parts of economics, and several parts of political science. In effect there have arisen a group of geographical sciences and a group of geographical social sciences. All should seek a certain amount of nurture from their mother, and will, if she can be found. Should she feed them the fruit of fad, as she has so often done in the past, the relationship between geography and its modern descendents will not long remain cordial.

Training of Geographers

To meet successfully the challenge arising from increased public interest in geography and the more liberal position the subject is likely to receive in school curricula, it is necessary that geographers agree within reasonable limits about such matters as the central theme of the field, so that general backgrounds of students being trained in geography be somewhat more uniform than has been the case in the past. The start must come toward the top of the educational ladder.

The first course at the college level should be a year of regional geography, a survey of the earth and its inhabitants. Such topics as space relations, climates, soils, and other subject matter of the "elements" course now widely inflicted on beginning students

should come later, as should much of the content of alternative commercial courses. Students dig into the question of why the Sahara is so dry after they have some knowledge of the landscapes and peoples of that desert and some realization of how it differs from lands on either side. The same subject is ordinarily regarded as boresome when first approached from the meterological standpoint in a first-year elements course. They regard the distinction between rain forest and savanna climates as something more than academic after learning about contrasts between Sudanese and rain forest cultures. Podsols and black earths readily become matters of practical interest to students who have associated, in a previous course, major forest and vegetational types, including domesticated cereals, with peoples.

Aside from its value to professional students, an extremely strong argument in favor of an introductory year of regional geography is the fact that it gives non-professionals the finest possible single-course contact with the geography department. Students who concentrate in other fields absorb far more useful information than they can possibly obtain from alternative introductory courses. No single action of a geography department is more cordially received by faculties as a whole than the simple matter of teaching the materials other departments really desire when they allow space in their programs for a course in geography.

The development of the professional curriculum beyond the first course must be governed by various factors, such as local demands, adequacy of staff and equipment, and educational philosophy of the department concerned. In general there can be considerable leeway as to the number and kinds of specialty courses offered along such lines as cartography, climatology, elements of physical geography, economic geography, political geography, etc., but every curriculum should contain at least two additional regional courses, one on either the United States or Anglo-America and the other on either the local state or region. Whether meteorology be included depends largely on the willingness of the physics department to handle the subject, and geomorphology on the attitude of the geology department. It is extremely desirable that a fundamental course on the elements of cultural geography be required of all senior students. In an undergraduate program it is far more important that students receive a broad and balanced education than that geography departments herd them into an overloaded curriculum of specialized courses.

First-Year Regional Course

Man should be the central figure in the regional survey course. The fundamental subdivisions of the earth's surface should be the broadest significant cultural groupings of mankind. Tho various terminologies are at our disposal, an extremely good means of subdivision is according to cultural "worlds."

Generally speaking, the cultures of Eurasia and Africa fall into the broad groups, Polar, European, Levantine (Dry belt from western Sahara to eastern Mongolia), and Oriental worlds. Within each are realms, such as Northwestern, Eastern, and Mediterranean, of the European world, or Arab-Berber and Turko-Mongolian of the Levantine world. Between worlds and realms are shatter belts, zones of clashing cultures and political instability, with confused transitions. Smaller than realms are individual nations, states, and other minor cultural subdivisions.

The Commercial Revolution, following the voyages of Discovery, initiated the greatest cultural upset in history, the New World Revolution. From Spain, Portugal, England, the Netherlands, France, and other European nations came a spread of European world culture to be superposed upon or to dispossess the cultures and peoples of many parts of the earth. The old and well-established Oriental and Levantine world cultures resisted the New World Revolution most successfully, altho many important inroads breached their stubborn defenses. Polar world peoples were affected only in limited areas, the physical severity of their environments being sufficiently hostile to prevent widespread European encroachments. African, American Indian, Polynesian, and other primitive cultural worlds resisted the movement about inversely to the values of their lands and possessions according to European appraisal.

The West Indies, Mexico, and west coast of South America were the first major theaters of New World Revolution. Various Pacific Islands, New Zealand, and Australia are among the newest parts of the New World. South Africa had a comparatively early start, but is mainly rather new in the New World. The revolution has been completed in practically all parts of the United States and southern Canada, in much of Argentina, and over most of Australia, but even now has barely touched remote areas in the Amazon Basin, or less accessible parts of northern Canada. A benevolent European Government has dulled its impact in Greenland.

Within the framework of the cultural world outline, the first

year in geography should be fundamentally regional. After a brief introduction, the cultural world concept may be illustrated effectively by taking an extremely simple case, the Polar world. Physical and cultural forms are readily defined and contrasted with those familiar to the class. While Lapp and Eskimo are generally similar, in contrast with peoples far to the south, across the broad and sparsely-inhabited taiga, the contrast between reindeer and seal cultures serves to introduce the idea of cultural realms.

The European world is introduced by a brief summary of physical geography of Europe in which contrasts are emphasized between Northwestern (North Sea focus, adequate or excessive rainfall at all seasons, relatively mild temperatures, etc.), Eastern (broad European Plain, moderate to light summer rainfall, extremely cold winters, etc.), and Mediterranean (Peninsulas of diversified relief, winter rain and summer drought, moderate temperatures, etc.) realms. Matters of race, language, religion, and nationality are considered next, in developing the idea that cultural realms exist in each of the three contrasted physical areas; (1) Nordic-Teutonic-Protestant, (2) Alpine-Mongoloid-mixed races-Slavic-Greek Catholic, (3) Mediterranean-Romanic-Roman Catholic.

After a short introduction, covering a realm as a whole, further elaboration leads to smaller units, such as (1) the British Isles, (2) Scandinavia, (3) the Low Countries, and (4) Germany, as most typical parts of the Northwestern European realm. The Eastern realm (European Russia, with the Siberian Wedge) is considered next, followed by a discussion of the Shatter Belt, or zone of cultural instability between Northwestern and Eastern realms (Finland, the Baltic States, Poland, fragments of Turkish and Austro-Hungarian empires, north of Greece and west to Bohemia). The Mediterranean peninsulas are taken up in order of historic significance. France and Switzerland are taken up last for the reasons that they share so many Northwestern and Mediterranean characteristics that they form a mild western Shatter Belt and therefore serve as an excellent basis for general review.

Half of the first-year course should be devoted to the Polar and European worlds, all but the first week or so being given to the latter. This proportion may not be permitted in all schools. Persons in charge of teacher training commonly demand greater emphasis on the Americas, or even on the United States alone. For a survey of the entire earth from a cultural standpoint, however, roughly

half of the time belongs to Europe, just as it does in any similar survey of world history. The demand for further specialization in the Americas should be met by courses beyond the main, first-year survey course in geography.

The second half of the first-year course should start with the Levantine and then proceed to African and Oriental worlds, leaving roughly from one-third to one-half of the time for the New World.

While the points to be stressed vary from one cultural group to the next there should be general uniformity in treatment so that each is considered from the standpoints, (1) physical characteristics of territory (natural landscapes), (2) the peoples who are present now, or who have left their impress as a result of habitation in past times, and (3) the region today (cultural landscape).

A first-year course planned more or less on the pattern just suggested follows the tradition of Herodotus and proceeds along the central theme of geography. It is a substantial contribution to the foundation of a broad education. It commands respect of students and finds cordial reception in college curricula. Members of other departments who prescribe or permit students to take a year of geography are grateful to find them receiving instruction along lines that helpfully supplement their own fields of interest.

The Future?

Geography departments in colleges are potentially in strong positions today. Several new departments have been created and others are contemplated. The handicap of inadequate personnel has been serious during War Years, but the general shift from demands of war to those of peace will return many geographers to academic life at a time when enrollments may be expected to increase sharply.

The outlets for students will undoubtedly broaden materially as a result of widespread employment of geographers in fields beyond the teaching profession during recent years.

What the relative position of geography departments may be in another decade depends on their performances in the years immediately ahead. Our extremely favorable prospects will result either in establishing our subject firmly or reaction from the spotlight of public attention may relegate it to a position inferior to the one held at the outbreak of the war. Sound programs built around the core of the field, the creation of strong introductory regional courses, professional specialization along lines indicated

by actual demand, and strict avoidance of fads will be the best insurance against failure.

The broader program of public enlightenment must proceed from the colleges, thru well-trained and firmly-grounded grade-school teachers, to the public at large. Widespread adoption of "global" as a slogan has served useful purposes in bringing geography to public attention, but only sound educational programs, pursued with vigor and patience for many years, can raise the general level of geographical knowledge above the discouraging plane it occupies today.

THE INFLUENCE OF SURFACE FEATURES UPON THE DISTRIBUTION OF MALARIA IN NORTHWESTERN MISSISSIPPI

William B. Brierly
Washington, D.C.

Introduction

Malaria distribution thruout the world is influenced by a multiplicity of factors among which are three significant geographical factors: temperature, precipitation and surface features. Temperature and precipitation influence the seasonal and total annual incidence of the disease and its wide distribution over the earth. On the other hand, the type and number of anopheline mosquito breeding places are directly related to surface features and consequently determine the local distribution of the disease. If temperature and precipitation permit the existence of endemic malaria in a certain region, surface features determine just where in that area it may be found. This combination of geographic influences is well depicted in southern United States where coincidence of periods of maximum temperature and maximum precipitation in low-lying humid areas favor maximum distribution of the disease.

The importance of geographical factors, in so far as malaria distribution is concerned, lies in their ability to produce the conditions best suited for maximum propagation of the malaria parasites and vectors. Since the density of the vector, probably as much as any other factor, determines the rate of malaria transmission, it is easy to show the close relationship of certain types of surface

features to the breeding of anopheline mosquitoes and therefore to the distribution of malaria in a given region.

The general relationship of surface features to the distribution of malaria has been known in this country for some time but very few detailed studies in micro-relief have been made. Northwestern Mississippi provides many places where the influence of contrasting surface features in a small area upon the distribution of malaria may be observed. It is the purpose of this paper to discuss some of the unique relationships which are apparent in two adjacent physiographic units sharply contrasted in relief—the Delta and the Loess Bluff Upland.

Malaria in Mississippi

Altho malaria is widespread in Mississippi at the present time, it is not as common as it was in the past. However, in spite of a considerable decrease in prevalence (from 1492 deaths in 1915 to 150 in 1941), Mississippi is still considered one of the most malarious states in the United States. The reason for this persistence, in spite of tremendous anti-malaria efforts, holds great interest for geographers concerned with health and related problems.

An examination of malaria mortality rates by counties from 1915 to 1944 indicates that the disease is not equally distributed thruout the state but is rather intense in some areas and sparse in others. Highest death rates, for example, are found in the Delta Region in the western part of the state whereas the lowest rates are reported in the pine lands of the southeastern counties of Mississippi. In general, the intensity of malaria infection, as indicated by mortality rates, decreases from west to east and from north to south. This particular distribution has changed only slightly in the past three decades, in spite of the considerable reduction in prevalence. This indicates that the factor or factors responsible have persisted for the period mentioned.

From a study of the principles of world distribution of malaria (i.e., that temperature and precipitation exercise an influence which approaches that of control over malaria distribution in the world), one might expect malaria to be most prevalent in southern Mississippi and less prevalent toward the northern part of the state, since the temperature is highest and the amount of precipitation is greatest in the southern part of the state and decrease in degree and amount northward. However, these expectations are not confirmed. Owing to the small area involved, local factors, as in any

other small area of the world, assume prime importance. Of the local factors, surface features are most significant.

The preceding paragraphs raise two questions. Why are certain parts of Mississippi much more malarious than other parts? Why are the most malarious areas of today the same areas that were most malarious several decades ago? The answer to these questions appears to be intimately associated with variations in surface features from one particular place to another. High malaria mortality rates are associated with flat, swampy areas, whereas low malaria mortality rates are associated with areas of rolling or rugged relief.

THE PHYSIOGRAPHY OF THE REGIONS CONCERNED

The area with which this analysis is mainly concerned is composed of two adjacent physiographic regions, namely: the Delta and the Loess Bluff Upland. These regions present sharp contrasts in surface features. The former is a flat, monotonous plain with many water bodies, the latter a rough rolling hilly area with relatively few hydrographic features. These conditions of relief and drainage are closely related to the distribution of malaria, as will be shown in the following pages.

The Delta Region

The floodplain of the Mississippi and tributary rivers in Mississippi is one of the most clearly defined physiographic features in the United States. It extends as a flat, monotonous plain from the Tennessee border on the north to Vicksburg in the south and midway between attains a maximum width of about 70 miles. It slopes only four or five inches to the mile eastward and southward. Consequently, drainage over most of the area is away from the Mississippi River in the direction of the bluff where the waters join the southerly flowing tributaries of the Yazoo River.

Gently sloping natural levees are present along the courses of the main streams. These slightly higher strips, bordering the streams, obstruct the natural flow of water from the tributaries and adjacent areas to the main streams and consequently create ubiquitous pockets of swamp land here and there.

The topography of the area is constantly being modified by the sinuous, shifting courses of the various streams which leave their marks on the Delta in the form of abandoned natural levees and

meander scars. The latter usually contain either ox-bow lakes or swamps.

Three general areas of the Delta are recognized (three dotted areas on Fig. 1): (1) a higher area not subject to overflow except during years of unusually high water, extends along the Mississippi River from the Tennessee border in the north to Issaquena county in the south; (2) an area subject to annual overflow lying between the higher area just described and the bluff; and (3) a poorly drained swampy area along the lower reaches of the Yazoo River formed by the backwater from the Mississippi and Yazoo rivers.

The Loess Bluff Upland

The relief of the Loess Bluff Upland contrasts sharply with that of the Delta Region. The area has a rolling hilly appearance with flat topped or slightly convex ridges, separated by deeply incised valleys which have their steepest slopes adjacent to the rivers. The area is well dissected and eroded by a series of streams which drain the higher land of the east, debouch upon the Delta edge and there form rather large alluvial fans. This area is perhaps the most rugged part of Mississippi. It is covered by thick deposits of alluvium and wind blown silt (loess)—hence the name —Loess Bluff Upland. The junction of the Loess Bluff Upland with the Delta Region is strikingly defined by a precipitous bluff several hundred feet in height.

A General Comparison of Malaria Mortality Rates in Bluff and Delta Counties

The importance of surface features as an influential local factor in malaria distribution is most clearly shown in the counties which are located on the rolling Loess Bluff Upland and in the flat Delta. Fig. 1 showing the average malaria mortality rates from 1930 to 1939, portrays a sharp line of demarcation along the western edge of the Loess Bluff Upland. It is most convincing in the north where the physiographic boundary between the Loess Bluff Upland and Delta Region roughly coincides with the political boundaries of DeSoto, Tunica, Panola and Quitman counties. The highest malaria death rates in Mississippi are found in Tunica and Quitman counties in the Delta; they are 67.0 and 50.5 per 100,000 respectively. The rates fall off rather sharply in adjacent counties on the Loess Bluff Upland to the east. DeSoto, for example, has a rate

of 19.8 and Tate a rate of 18.5 per 100,000. Tallahatchie County, on the other hand, lying partly in the Delta and partly on the Loess Bluff Upland has a rate of 40.5, which is about midway between that of adjacent Delta counties and of the Loess Bluff Upland counties. The counties of the latter region having the largest percentage of Delta land included within their boundaries, have the highest malaria death rates. Also, the malarious areas of the Loess Bluff Upland occur mainly in the bottom lands of the river valleys that lead to the Delta and are in reality extensions of deltaic conditions.

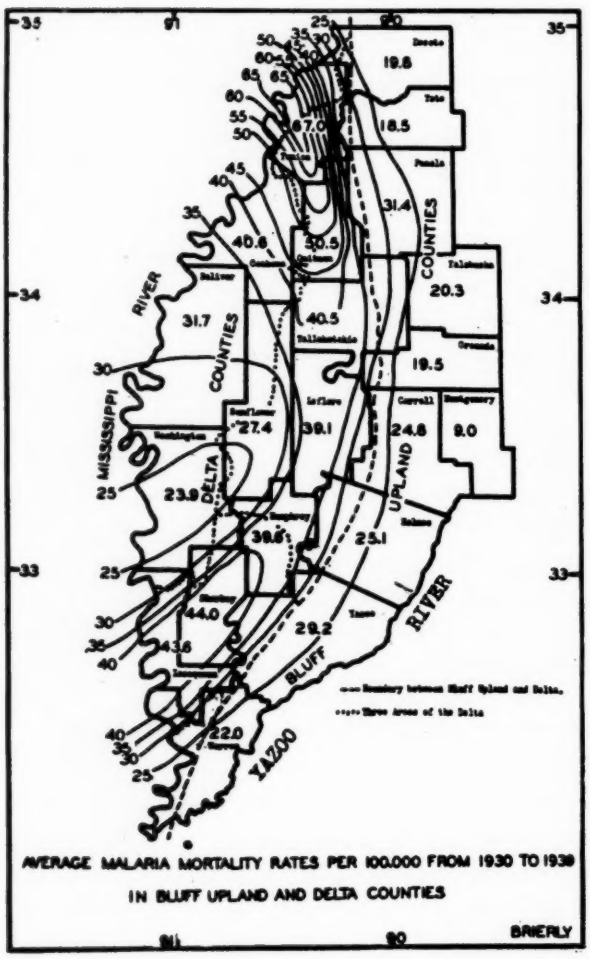

Fig. 1. The average malaria mortality rates per 100,000 population in the loess bluff upland and delta counties of Mississippi from 1930 to 1939.

From what has been said about the distribution of malaria mortality rates and the distribution of various surface features in both of the physiographic units discussed, it is apparent that there is a certain coincidence of flat, swampy relief with much malaria and of rough or rolling relief with little malaria. This difference in rates between the Delta and Loess Bluff Upland counties can be almost wholly ascribed to the low-lying areas within the respective physiographic units, since the population density in all of the counties does not differ greatly (Tunica

50.8, Quitman 64.1, DeSoto 53.6, Tate 44.2, Panola 41.2 and Tallahatchie 56.5 persons per square mile in 1930) and since there are no abrupt changes in socio-economic conditions.

A General Comparison of Mortality Rates in Delta Counties

It is well known that moving water heavily laden with soil particles immediately deposits these particles when stream movement is checked. During flood periods rivers usually carry a heavier load of soil particles than during periods of normal flow, and when they overflow their banks, this load is deposited as the overflowing water is retarded. The coarser and heavier particles, such as sand or gravel, are deposited adjacent to the river, while the finer and lighter particles, such as silt or clay, are carried a considerable distance before being deposited. Consequently, in a flat deltaic plain area, the highest land is usually found along the banks of the streams (natural levees) gradually sloping away from the river. With this process continuing for decades and centuries, many of the rivers on some of the large deltaic plains of the world build their beds so high that they are above the general level of the plain. In the Delta Region of Mississippi the highest land is adjacent to the Mississippi River (natural levees), gradually sloping eastward four or five inches to the mile as far as the base of the bluff. This slight difference in relief within the flat deltaic plain, like the comparison between Loess Bluff Upland and Delta counties, is associated with differences in malaria distribution. Coahoma, Bolivar, Sunflower and Washington counties (all adjoining or close to the Mississippi River), with average malaria mortality rates of 40.6, 31.7, 27.4 and 23.9 per 100,000 respectively, have relief in some cases over forty feet greater than adjacent counties to the east and south—Quitman, Tallahatchie, LeFlore, Humphrey, Sharkey and Issaquena—which have higher malaria mortality rates of 50.5, 40.5, 39.1, 39.6, 44.0 and 43.6 respectively. This difference can be ascribed largely to relief, the latter counties being lower in altitude and much less well drained than the former. In the Delta the number of water bodies increases from west to east and this parallels the decreasing altitude.

In the above case it might be rightfully argued that population must necessarily be included as a factor of importance. However, if the population density is further taken into consideration, it would only strengthen the importance of the relief factor, because the easternmost counties of the Delta have a higher malaria mor-

tality, but they have lower population densities on the average (with the exception of LeFlore and Sunflower counties). This relationship emphasizes the principle that the greater the density of population, the more available are human parasite carriers and the easier the transmission of the disease from person to person by mosquitoes.

Now that it has been shown that there are considerable differences in malaria distribution within the areas of contrasting surface features, what is the physiographic basis underlying this unequal distribution?

WATER BODIES

Within the State of Mississippi the common malaria mosquito, *Anopheles quadrimaculatus,* is of such a type that temporary or permanent bodies of *quiet water* are necessary for development of the eggs, larvae and pupae. It follows, then, that areas which have the greatest number of available water bodies or the greatest surface of quiet water have the questionable honor of furnishing the best opportunities—other factors being equal—for becoming the most malarious areas. It further follows that lowland areas usually have the greatest number of water bodies, because there is a greater surface exposed for the development of pools, and because in such regions the water table usually lies closest to the surface. In these circumstances almost any depression may extend below the water table and contain a permanent pool of water. Such areas in regions of relatively heavy precipitation (like Mississippi) have poor surface runoff, and consequently the smallest depression may contain temporary pools during the breeding season sufficient for the development of one or two generations of malarial mosquitoes.

In traveling about Mississippi, one is particularly impressed by the considerable number of water bodies in many parts of the state. If these pools contain emergent vegetation and the water is clear, they will be suitable for anopheline breeding. These surface water bodies are especially common and last longest in the clay soil areas because of the imperviousness of tenaceous clays. In some parts of the state where such surface water bodies are infrequent, the Mississippi farmer has especially favored the anophelines by building small reservoirs as sources of drinking water for his cattle. If these pools contain vegetation, as many of them do a few years after construction, they will serve as breeding places. The writer has observed that in many of these reservoirs

the edges are so completely trampled by cattle that vegetation does not exist at all. If the dams of these reservoirs are three or four feet high, they are generally too high for the cattle to climb, consequently some of the vegetation at the base of the dam escapes being trampled by the cattle. These small areas are favorable to restricted anopheline breeding. On the other hand, if the water becomes turbid or is splashed about considerably by the cattle, no anopheline breeding will take place, regardless of whether vegetation is present or not.

Some of the streams of the state are fed by springs and artesian wells and contain flowing water thruout the year. Such streams are of little importance in so far as the distribution of malaria is concerned. In such areas of Mississippi as the Black Belt, the Flatwoods and the Jackson Prairie where streams are rare, the drainage ways contains water only during and after heavy rains. Such streams, however, when they become intermittent during the relatively dry months of summer, may form a series of pools which for limited periods may provide breeding places for malarial mosquitoes.

In recent years numerous lakes, both large and small, have been created in order to provide flood control, to prevent soil erosion, and for recreational purposes by the War Department, State Fish and Game Commission, State Park Commission, and other agencies and individuals. These impounded water bodies, like the public utilities' and lumber companies' lakes of the past, have greatly increased the malaria hazard by providing suitable malarial mosquito breeding places. In the last few decades the malaria hazard of such artificially constructed water bodies has been recognized in the courts in many parts of the South as a legitimate basis for awarding indemnity to residents contracting the disease.

The gradient of all main streams in Mississippi is low, in few places exceeding a fall of a foot to the mile. Some gradients are less than others, as for example, those of the sluggish, widely meandering streams of the Yazoo Delta, which have a fall of only a few inches to the mile. The gradients of streams of the Loess Bluff Upland, however, are steeper than those of the flat Delta. Anopheline breeding places are usually quite numerous in river valleys with low stream gradients, whereas they are relatively uncommon in river valleys with relatively steep gradients.

The streams that drain the uplands of Mississippi, unlike those of the Delta, belong to the normal class of streams that are char-

acteristic of most of the well-watered regions of the earth's surface. They are well incised and dendritic. There are no interconnecting channels between the branches, and usually there is only one main stream in each local valley. Anopheline breeding places in such areas are uncommon.

Drainage in the Delta differs from that in the Loess Bluff Upland in that the currents of the streams are sluggish, the channels are widely meandering, and networks of interdigitating channels or bayous connect the tributary branches with each other and with the numerous ponds, lakes and swamps of the area. Mosquito breeding places in such areas are extremely common provided the water is relatively motionless.

Natural lakes, ponds and pools are rare in the Loess Bluff Upland, except in the floodplains of some of the larger streams where they occur chiefly in the form of abandoned channels partly filled with sediments. They are numerous, however, thruout the Delta where they are also remnants of partly or completely abandoned stream channels or shallow undrained depressions in the flat plain. If these water bodies have clear quiet water and are choked with emergent or floating vegetation, they are usually ideal breeding places for anopheline mosquitoes.

Swamps, like other water bodies, are relatively uncommon in the Loess Bluff Upland away from the streams. They are occasionally present, however, along the floodplains of the larger streams which cross the area. Many of the swamps in this particular area, because of their small extent, have already been artificially drained, thereby reducing the number of anopheline breeding places. The swamps of the flat Delta, formerly very common, likewise have been considerably reduced since 1886 when a system of protecting levees and drainage canals was constructed, but swampy tracts in the Delta are still numerous.

SWAMPS OF THE DELTA REGION

As previously mentioned, swamps are of particular importance to the distribution of malaria because they provide breeding places which are highly favorable to *Anopheles quadrimaculatus,* the common malaria carrier. The importance lies in the particular characteristics of the water body—they are either quiet or have currents that are scarcely perceptible. Swamps then, contribute greatly to anopheline production and consequently favor a high morbidity and mortality rate and wide distribution in suitable

areas. Since swamps are almost always found in level areas and since such land is greatly coveted as crop land in Mississippi be-

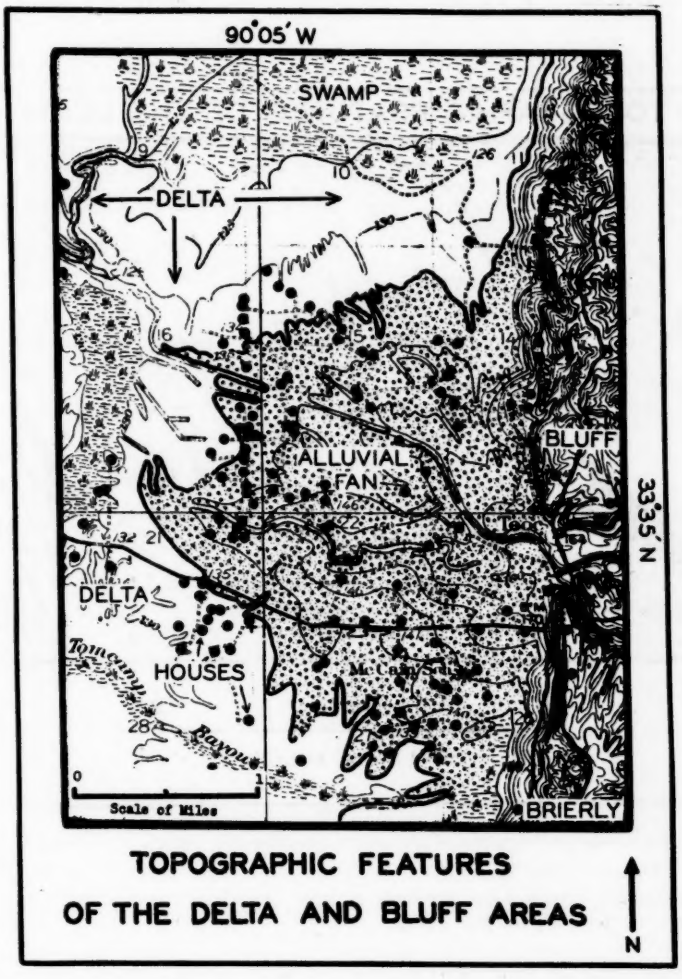

Fig. 2. Topographic features of the delta and loess bluff upland areas showing an alluvial fan (stippled area) protruding into the delta at the base of the bluff. Notice the proximity of the dwellings (black circles) to the surrounding swamps in which the malaria mosquitoes breed. Map is reproduced from a section of the Greenwood Quadrangle, U.S.G.S. and modified in the field by the writer.

cause of its levelness and the inherent richness of alluvial soils, the population naturally gravitates toward swamp land, thus facilitating the spread of malaria. In general, wherever swamps occur, people live within the flight range of the anophelines.

Several genetic types of swamps are found in the Delta Region and each type differs in importance with regard to its proximity to heavier populated areas. The following examples illustrate the point.

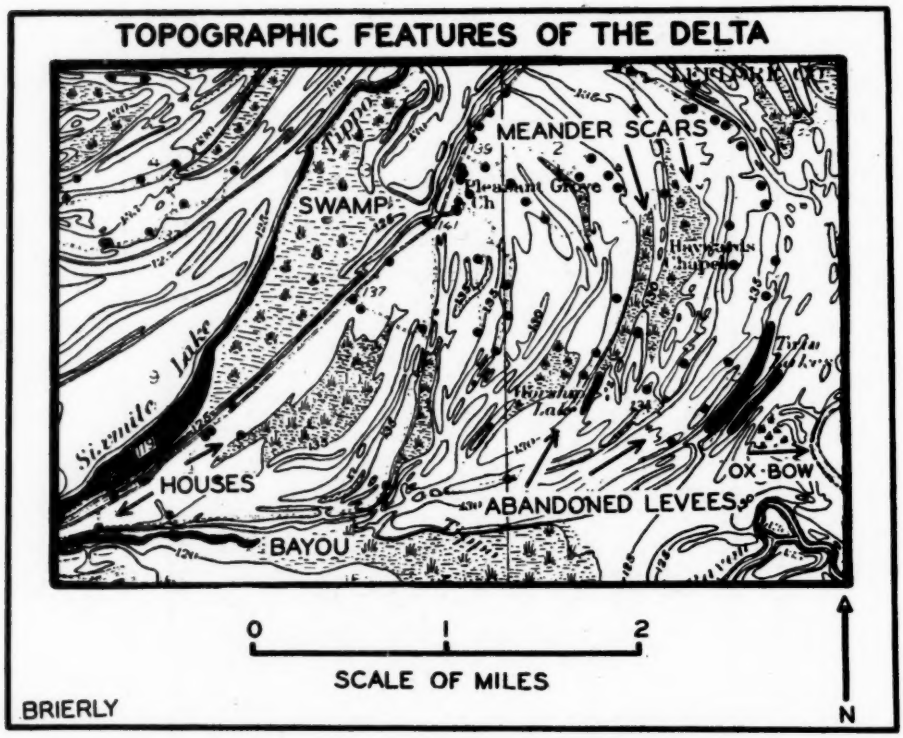

Fig. 3. Topographic features of the delta showing the proximity of dwellings (black circles) on abandoned levees to meander scars containing swamps or lakes in which malaria mosquitoes breed. Map reproduced from the Greenwood Quadrangle, U.S.G.S. and modified in the field by the writer.

The swamps of the backwater region of the Yazoo and Mississippi rivers in Humphrey, Sharkey, Issaquena, Yazoo and Warren counties (all lying north of Vicksburg) are flooded every year and consequently provide multitudinous pools for anophelines during the breeding season. Even tho there is a rather limited population adjacent to the swamps (the density per square mile in Humphrey is 60.6, Sharkey 32.9, Issaquena 14.1, Yazoo 29.1 and Warren 62.6),* they have some of the highest malaria death rates in the

* The malaria mortality rate in the State in 1940 was 7.5 per 100,000 and the density of population per square mile in 1930 was 43.4.

State. Humphrey has a malaria mortality rate of 39.6, Sharkey 44.0, Issaquena 43.6, Yazoo 29.2 and Warren 22.0 per 100,000.

The swamps of the Delta (lying north of the backwater region and parallel to the bluff) formed between the natural levees of the various rivers and the alluvial fans at the base of the bluff are important because both the natural levees and the alluvial fans make rather good crop land and are consequently populated down to the very edge of the swamps (Fig. 2).

Thruout the Delta, meander scars are a conspicuous part of the topography. These meander scars often contain either swamps or remnants of ox-bow lakes and are a severe menace to health. With an unlimited source of anopheline mosquitoes and a relatively dense population heavily infected with malaria parasites, it is thus a simple matter for the anophelines to distribute the disease everywhere locally. The high mortality rates in this area testifies to the effectiveness of the swamps and ponds in maintaining the disease (Fig. 3).

Thruout the Delta as a whole, the numerous breeding places dispersed thruout the best agricultural land in the State, place continuous risk upon the population at large because the total population is always within striking distance of the mosquitoes.

Conclusions

Malaria distribution within the flat Delta and certain hilly counties of the Loess Bluff Upland of Mississippi shows close coincidence of flat, swampy land with much malaria and of hilly relief with little malaria. Even slight differences in micro-relief within the flat Delta are reflected by differences in malaria distribution as portrayed by malaria mortality rates. The anopheline mosquito concerned with transmitting malaria in Mississippi is of such a type that clear, quiet water bodies containing emergent vegetation are required for development of its eggs, larvae and pupae. The flat Delta with its great number of swamps, ox-bow lakes, and surface depression pools with interdigitating sluggish creeks, in some cases choked with vegetation, provides unlimited breeding places for these malaria carrying mosquitoes. The hilly Loess Bluff Upland, on the other hand, with its deeply incised streams with comparatively steeper gradients, its sparseness of quiet pools, and its lack of extensive swamps, has comparatively few breeding places which are favorable to anopheline mosquitoes.

Furthermore, altho both of the areas under consideration are not densely populated, in the Delta the population is located close to the many water bodies, whereas in the Loess Bluff Upland there are few breeding places within striking distance of the population.

General References

[1] Preliminary Report of the State Planning Commission of Mississippi. Jackson, Mississippi, January 1, 1938.

[2] Malaria Mortality Statistics. Photostatic Copies by the State Board of Health, Jackson, Mississippi, 1941.

UNIT I. FOR COURSE IN GLOBAL GEOGRAPHY OFFERED AT THE NEW KENSINGTON HIGH SCHOOL

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Outline and Study Assignment for Unit I: Introduction to the Earth

I. Overview

The airplane has shrunk the world and has bound nations more closely together thereby necessitating a new geographical thinking and interpretation. Thus there is a need for accurate basic concepts of the earth, its size, shape, movements, directions and distances; to acquire a knowledge of location and character of the surface features of the earth in the light of their relationship to man's activity; to learn the technique of using maps, plotting data, and comparing maps; to develop in the students the consciousness of things which lie beyond his horizon, and to recognize the unity of the earth.

II. Outline

A. The Universe
   1. Meaning of Universe
   2. Size
   3. Composition
   4. Relation of our Solar System to it
      a. Theories as to origin
      b. Parts
      c. Position of Earth in the Solar System and its relation to the sun

B. The Earth—Size and shape
   1. Sphere—spheroid
   2. Circumference—equatorial, meridianal
   3. Diameter—polar, equatorial
   4. Area
      a. Total area in square miles
      b. Area below ocean
      c. Area of land above ocean

C. The Sun
   1. Size and shape
   2. Weight
   3. Motion
   4. Temperature
   5. Distances from earth

D. Movement and Position of the Earth
   1. Position of earth's axis in degrees. Position of earth's axis at all time to the plane of the elliptic.
   2. Rotation on its axis
      a. Meaning of rotation and axis
      b. Direction it rotates
      c. Time it takes
      d. Result
   3. Revolution of earth
      a. Meaning of revolution
      b. Direction
      c. Time it takes
      d. Result
   4. Migration of vertical rays of sun
      a. Areas where vertical rays of sun strike the earth on the following dates: March 21; June 21; September 22; December 21
      b. Length of day at North Pole—during summer—winter
      c. Length of day at Arctic Circle June 21, December 21
      d. Length of day at South Pole during summer solstice—winter solstice—equinoxes
      e. Length of day at Antarctic Circle June 21, December 21
      f. Longest day in year in northern hemisphere—shortest day
      g. Longest day in year in southern hemisphere—shortest day

E. Grand Divisions of the Earth
   1. Man in relation to the spheres
      a. Atmosphere
      b. Lithosphere
      c. Hydrosphere
   2. Great Land Masses and Waterbodies
      a. Continents, islands, etc.
      b. Oceans, seas, bays, straits, etc.
   3. Directions on the Earth
      a. Main directions
      b. Geographical Pole
      c. Magnetic Pole
      d. Clockwise
      e. Counter Clockwise
      f. Terms up and down—misuse

F. Location: Latitude and Longitude
  1. Street System of earth's surface
    a. Parallel—latitude
    b. Meridian—longitude
    c. Division streets—equator—prime meridian
  2. Latitude
    a. Meaning of Latitude
    b. Meaning of North Latitude
    c. Meaning of South Latitude
    d. Symbol used to indicate latitude
    e. Latitude of the following: Equator; Tropic of Cancer; Tropic of Capricorn; Arctic Circle; Antarctic Circle; North Pole; South Pole
  3. Longitude
    a. Meaning of Longitude
    b. Meaning of East Longitude
    c. Meaning of West Longitude
    d. Meaning of Meridian—Prime Meridian
    e. Symbol used to indicate longitude
  4. Longitude and Time
    a. Differences in time in United States
    b. Time Zones in United States
    c. Time Zones in the World
    d. Reasons for time belts
    e. International Date Line

G. Maps
  1. Globe best source—only true map
  2. Why flat maps are necessary—desirable features
  3. Kinds of maps
    a. Physical
    b. Political
    c. Population
    d. Vegetation
    e. Contour
    f. Economic
  4. Use of lines, dots, colors, and other symbols
  5. Map projections. Advantages and disadvantages of four chief projections: Mercator; Gnomonic; Lambert unformal conic; Polyconic

H. Effect of Air Age
  1. World is Shrinking
  2. Transportation changes—Kinds and problems
  3. Great Circle Routes
  4. New direction concepts
  5. New strategic areas

III. Study Assignment Sheet

Unit I. (Laboratory Work)

Introduction to the Earth

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The Earth as a Part of the Solar System

1. How many known planets are there? Name the planets—begin with the one closest to the sun and end with the one farthest away.
2. Draw a diagram showing each planet in its relation to the sun.
3. How far is the earth away from the sun? the moon? How does the earth compare in size with the sun? with the moon?

Shape and Size and Divisions of the Earth

1. What is the shape of the earth?
2. What is the size of the earth—equatorial diameter? polar diameter? meridianal circumference? equatorial circumference?
3. Does man live on the outside or inside of the earth? Prove your answer.
4. Approximately what percentage of the earth's surface is water? land?
5. What is the area of the earth's surface in square miles? How many square miles of this area lies above the ocean?
6. On an outline map of the world locate the following: (1) the seven continents, (2) the five great oceans, (3) the following islands: Greenland, Iceland, Madagascar, West Indies, East Indies, New Zealand, Aleutians, Newfoundland, Falklands, Philippines, Japan, Canary, Islands of Pacific (example—Hawaiian, New Caledonia, Gilbert, Marshall, Solomon, etc.), Islands of the Mediterranean, (4) Seas: Mediterranean, Caribbean, South China, East China, Black, Aegean, Adriatic, Red, Caspian, Arabian, Arafura, Timor, Celebes, Tasman, Coral, Sula, Baltic, North Sea, Sea of Japan, Bering, Yellow Sea, (5) Gulfs or Bays: Gulf of Oden, Persian, Bay of Bengal, Gulf of

Aman, Gulf of Siam, Hudson Bay, Gulf of Carpentaria, Gulf of Finland, Gulf of Bothnia, (6) Straits and Canals: Bering, Gibraltar, Magellan, Bosporous, Davis, Denmark, Kiel Canal, Panama Canal, Suez Canal, (7) Important lines: Arctic Circle, Antarctic Circle, Equator, Tropic of Cancer, Tropic of Capricorn, Prime meridian, International Date Line.

Movements and Position of the Earth

1. How long does it take the earth to rotate once upon its axis? Define rotation, mentioning the direction of rotation.
2. Define revolution, mentioning the direction and the time it takes.
3. What is the position of the earth's axis at *all* times to the plane of the elliptic?
4. How is the earth held in its orbit?
5. Mention a result of rotation. Mention a result of revolution.
6. Where does the vertical rays of the sun strike the earth on the following dates: March 21, September 22, June 21, December 21?
7. Name the spring, summer, autumn, and winter months for the northern hemisphere, for the southern hemisphere.

Location: Latitude and Longitude

1. Define: latitude, north latitude, south latitude.
2. What places on earth have the lowest possible latitude? highest possible?
3. What symbol is used to indicate latitude?
4. Find the latitude of the following: Equator, Tropic of Cancer, Tropic of Capricon, Arctic Circle, Antarctic Circle, North Pole, South Pole.
5. What is the specific latitude of New Kensington? Name two other cities in about the same latitude.
6. One degree of latitude equals approximately 70 miles (exact 69.172). How many miles north of the equator is New Kensington?
7. Latitude range: Between what two parallels of latitude do the following countries and continents lie? United States, British Isles, South America, New Guinea, Australia, Greenland, Japan, Russia, Italy, China, Brazil, Canada, Mexico?
8. What is the latitude of the following cities? Use map of United States.

Cities	Latitude

1. Philadelphia
2. Pittsburgh, Pa.
3. Chicago
4. Boston
5. New York City
6. Denver
7. Los Angeles
8. Portland, Oregon
9. Detroit
10. New Orleans
11. Salt Lake City
12. Memphis, Tenn.
13. Springfield, Ill.
14. Baltimore

Name 5 cities lying near 40° north latitude
Name 3 cities lying near 45° north latitude
Name 4 cities lying near 35° north latitude
Name 3 cities lying near 30° north latitude

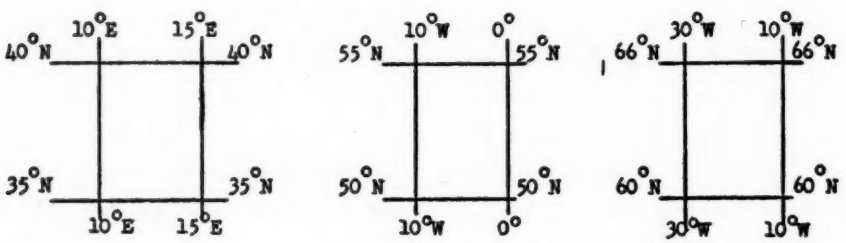
9. Define: longitude, meridian, east longitude, west longitude.
10. What points on the earth have the lowest possible longitude? greatest possible?
11. How does the arrangement of meridians differ from that of parallels of latitude?
12. Find a place on the earth having 0° 00′ 00″ latitude and 0° 00′ 00″ longitude.
13. What meridian of longitude does New Kengsington lie near?
14. Longitude range: Between what two meridians of longitude do the following countries lie,—Alaska, United States, Brazil, Russia, Siberia, India, Dutch East Indies, Germany, and China?
15. How many degrees east of London are these cities—(Use map of Europe) Belgrade, Budapest, Hamburg, Munich, Rome, Leningrad, Archangel, Oslo, Helsingfors, Paris?
16. Six airplanes have radioed their positions as follows. What countries are they near?

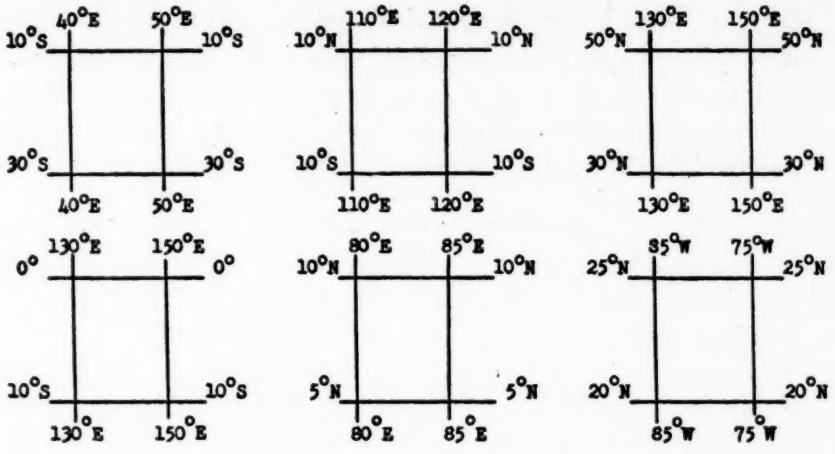
Latitude	Longitude	Countries
15° S	35° W	
50° N	135° W	
20° S	160° E	
30° S	80° W	
10° S	20° W	
35° N	70° W	
20° N	95° W	
10° S	80° W	
55° N	5° E	
20° S	60° E	
50° N	140° E	
10° S	80° E	

17. A city can be found at or close to the point where the latitude and longitude lines intersect.

Latitude	Longitude	Cities
30° S	151° E	
30° N	90° W	
37° N	123° W	
47° N	71° W	
22° N	88° E	
43° N	132° E	
12° S	131° E	
42° N	88° W	
34° S	58° W	
41° N	74° W	

18. Locate, sketch in, and name an island indicated by the parallels and meridians below. Use World Map. Goode's Atlas.





19. Tokyo is at a latitude 35°N and longitude 140°E. Suppose Major General Doolittle and his bombing squad had taken off from a base at latitude 15°N and 120°E,—where was the base located and what direction would he have flown?
20. London is about 52°N and 0° and Berlin is about 52°N and 18°E. How far is Berlin from London?

Longitude and Time

1. Make a map of the world showing time zones. Make a map of the United States showing the time zones.

When it is—	What time is it in?
7 P.M. in New Kensington	_____ London
2 P.M. in London	_____ New Kensington
12 noon in New Kensington	_____ San Francisco
12 noon in San Francisco	_____ Denver
4 A.M. Sydney	_____ New York
12 noon San Francisco	_____ Shanghi
1 P.M. Chicago	_____ Tokyo
6 A.M. Washington, D.C.	_____ Berlin
5 A.M. Honolulu	_____ Tokyo
10 A.M. Rome	_____ New Kensington
2 A.M. New York	_____ Moscow
12 noon London	_____ Leningrad

2. Choose 10 different cities of the world in various standard time belts. Draw ten clocks showing correct time at the same instant.

Map Projection

1. Why is the globe the best source for studying the world?
2. List five methods of map projection. Tell the advantages and disadvantages of the Mercator projection. Goode's *Atlas* p. 2 and *Globes, Maps and Skyways,* Bauer p. 26-44.

Important Terms to Identify

1. universe
2. environment
3. geography
4. global
5. sphere
6. spheroid
7. hemisphere
8. planet
9. diameter
10. circumference
11. magnetic
12. axis
13. topography
14. meridian
15. prime meridian
16. parallel
17. equator
18. Solar
19. latitude
20. longitude
21. gnomonic
22. mercator
23. polyconic
24. orbit
25. nautical
26. projection
27. conformal
28. International Date Line
29. Tropic of Cancer
30. Tropic of Capricorn
31. contour
32. Arctic Circle
33. Antarctic Circle
34. degree

Activities or Work Projects

1. From the newspapers today, in connection with the war news, list 25 cities. Write the name of the country they are located in and give the approximate latitude and longitude of each place.
2. Draw a polar projection map. Locate the continents and 25 of the largest cities in the world. (Use *New World Horizons,* Lawrence p. 12; *Our Global World,* Engelhardt; *Maps,* Consolidated Vultee Aircraft Corporation.)
3. Write a report and be prepared to give a floor talk on the following topic: "The World has Shrunk." *Our Global World,* Engelhardt p. 25-34.
4. Indicate by drawings the relation of the sun to the earth on March 21, June 22, September 21, and December 22. (Page 1, Goode's *Atlas.*)

KEEPING A DAILY RECORD OF THE TEMPERATURE

MAMIE L. ANDERZHON
Oak Park, Illinois

ASSIGNMENT

A daily record of the temperature which we may use for observation of temperature change from day to day, month to month and annually. (The record is made for the student's home community.)

EQUIPMENT

1. Thermometer (It is convenient to have a weather box protect the thermometer and barometer outside the classroom window. Such a box can easily be made and fastened to the window ledge outside so the window can be opened when readings are taken. Otherwise you may use the facts you know about the position of the sun, to choose a window where the thermometer will be protected from the direct rays of the sun. Why would you choose a north window if you live in the Northern Hemisphere?)

2. Wrapping paper—approximately 20 inches by 16 inches (1 for each month)

3. Strips of paper cut from typewriter paper ½ inch by 11 inches, divided into tenths. A heavier line may denote each tenth space. (If you live in a latitude where the temperature rises above 100° and falls below 10° longer strips will be needed for these days, since this scale of one-tenth inch on the 11 inch strip numbers from —10, 0, 10, 20, 30, etc. to 100.)

4. Daily Weather Reports from the local newspaper

5. Monthly and Annual Weather Reports from the U. S. Department of Commerce

BACKGROUND

1. The highest and lowest temperatures should be recorded whether the chart be a daily, monthly or annual recording since it is the extremes in temperatures which affect the crops during the growing season and also play an important part in determining the length of the growing season.

2. Growing temperature is considered to be 50° and above.

Above 86° is VERY HOT
68° to 86° is HOT
50° to 68° is WARM
32° to 50° is MILD
14° to 32° is COLD
Below 14° is VERY COLD

DIRECTIONS

1. Thermometer readings may be made daily. A plan should be agreed upon and followed systematically. The plan should include:

Hours the readings are to be made, such as say every hour, or 9:00 A.M., 12 o'clock noon, 3:00 P.M., or whatever other time-intervals are convenient.

The arrangement of the chart must be planned. Different colors may be used for each time of day the temperature is recorded. In this way the line for each time is easier followed.

2. In preparing the chart it should probably be approximately 20 inches by 15 inches.

The heading may include: MONTH, YEAR; PLACE; CLIMATE; Students or committee responsible. The days will appear at the top of the chart for each vertical column that has been ruled into convenient spaces.

3. Place a dot on the line of temperature in the center of the vertical column for the day the recording is made. Since this is a line graph showing several daily recordings the dots for each hour on each day should be connected by a characteristic line or colored pencil as suggested above.

4. Using the temperature reports of the local newspaper record in red pencil or in some other distinguishing manner the highest and lowest temperature for each day. Mark the hour this temperature is recorded on the colored line. In this way you will have a record of the highest and lowest readings with which you can compare your readings.*

Student's Comparison Summary

1. From your daily records of temperature note the hour the temperature is highest and lowest. Is the temperature highest when the sun is at high noon? How do you explain the difference between the 9 A.M. temperature and the 3 P.M. temperature for any day when both times are 3 hours from the high noon sun position?

2. Observe how the temperatures vary from day to day, week to week, and month to month.

3. What days of the month under observation are frost-free? What months are frost-free. How do frost-free periods affect the growing season?

4. If you keep a temperature chart for September and October observe the temperature after the first frost. We often speak of this period after the first frost as Indian Summer. Why? Note this period on your temperature charts.

* Climatic charts such as published by the University of Chicago. Dr. Henry Leppard, editor, are valuable for keeping monthly and annual climatic records.

Student's Summary

1. It might be suggested that a daily weather report be issued, possibly at 1:00 P.M., each day compiled by the chairmen or students on the different committees. This report might be a mimeographed or dittoed form designed by the students and can include the following, plus any other data suggested by the students.

DATE
TIME

Temperature reading
(Can be a thermometer
designed by the students)

Pressure reading
(A barometer design)
by a student

WIND DIRECTION
and
velocity if available
(high or low wind can
be indicated)

PRECIPITATION
Rain
Snow

PREDICTION:
Weather yesterday:
Temperature Highest
Lowest
Pressure Rising
Falling
Wind Direction
Precipitation Kind
Amount

Signed by the students or committee.

ELEMENTARY METEOROLOGY IN JUNIOR HIGH SCHOOL GEOGRAPHY

PETER GREENLEAF
Junior High School 223, Brooklyn

World conditions today have brought into clear focus the tremendous importance of meteorology in connection with aeronautics. Since the fundamentals of meteorology are first taught in the junior high schools, it is of vital importance that it be presented so as to enable the pupils to grasp the principles involved in nearly all phases of weather observation and interpretation of conditions.

Here is presented a method which can be used in the junior high schools whereby students can develop an interest in and an understanding of daily weather observations. It will especially give to them the ability to make short range forecasts.

At the beginning of each class period during the day weather elements are checked and observations entered on chart arranged as follows and posted in the science or geography room.

ELEMENT	9:00	9:45	10:30	. . . ETC.
Temperature—Dry Bulb °F				
Temperature—Wet Bulb °F				
Relative Humidity				
Precipitation				
Wind Velocity (Code)				
Wind Direction				
Barometer (in. Hg.)				
Type Clouds				
Remarks				

Each group of observers forecasts the weather using its own observations in conjunction with preceding reports. Forecasts are based on the following rules:

1. A falling barometer indicates an approaching "low" with a storm.
2. A rising barometer indicates the passing of the "low" and the approach of a "high" and fair weather.
3. The passing of a "low" in summer, will be followed by warmer weather.
4. The passing of a "low" in winter will be followed by colder weather, perhaps with a "cold front" blowing from the "Far North" and with blizzards in regions east of the Far West.
5. Winds from the south or southeast foretell of a "low" coming from the west with its center to the north of the observer, and with rain to come within 24 hours or sooner.
6. Winds from the east or northeast foretell of a "low" coming from the west with its center to the west or to the south of the observer, usually with heavy, chilly rain, and cold weather.
7. Winds swinging from the southeast to the southwest indicate that the center of the "low" is to the east of the observer and that fair weather will follow shortly.

8. Winds swinging from the east or northeast to the northwest also indicate that the center of the "low" has passed to the east of the observer and that fair and colder weather will soon follow.

9. Cirrus and cirro-stratus clouds, coming from the west with a gray sky, indicate the approach of a "low" with a storm.

10. A bright blue sky with cirrus wisps and with the wind in the west or northwest will be followed by fair weather for 24 to 48 hours or longer.

11. A bright blue sky with numerous cumulus clouds may be followed by strato-cumulus and rain or snow flurries during the middle of the day and early afternoon, but fair at sundown.

12. Calm, humid, warm to hot days during the spring may be expected to produce thunder storms.

13. If the lightning of a thunderstorm appears to the northwest, west or southwest, the thunderstorm will come nearer the observer and perhaps pass overhead.

14. If in fall or spring the temperature falls at the end of a clear, calm day to 40 or 45 degrees Fahrenheit one may expect frost in all low places by morning.

15. Frost will not form under the conditions above if clouds cover the sky before the morning or if a wind of any sort blows during the night.

16. Dew will form every night if there is no wind and the sky is clear so that ground heat may be radiated to space.

The 2:15 P.M. forecast should be posted on the bulletin board of the school. It has been found that such forecasts relating to predictions for the evening and night are 80% accurate. "Observers" are rotated in each class and perform their duties without specific direction. Precipitation and wind velocity observations can be descriptive rather than quantitative if appropriate equipment is lacking. In such cases use the code recommended by the United States Weather Bureau in their pamphlet titled "Weather Forecasting."

INTEREST-STIMULATING DEVICE

PLACES OF ASIA

(Alphabetically Arranged)

The following places are in Asia. The initial letter of each in the order given makes up the alphabet. Write in the name of the place or feature described.

A. The capital of Turkey ..... _____
B. Strait separating Europe and Asia ..... _____
C. Island at the tip of India ..... _____
D. The capital of India ..... _____
E. One of the rivers of Iraq ..... _____
F. Island from which much camphor comes ..... _____
G. Chief river of India ..... _____
H. British owned island off the coast of south China ..... _____
I. Present name of Persia ..... _____
J. Country off the coast of China ..... _____
K. Peninsula of northeastern Asia ..... _____
L. River of Siberia flowing into the Arctic Ocean _____
M. Country which was formerly a province of China ..... _____
N. Large city of China, at one time the capital . _____
O. Important port of Japan ..... _____
P. Country in which Christ was born ..... _____
Q. Ferry port on the Suez Canal ..... _____
R. Sea between Africa and Arabia ..... _____
S. "Home" of the elephants ..... _____
T. Country occupying Asia Minor ..... _____
U. Low mountains which in part divide Europe from Asia ..... _____
V. Pacific port and eastern terminus of Trans-Siberian Railroad ..... _____
W. River upon which Shanghai is located ..... _____
Y. Great port of Japan ..... _____
Z. A hill in Jerusalem ..... _____

W. O. Blanchard

University of Illinois

JOINT MEETING

NATIONAL COUNCIL FOR THE SOCIAL STUDIES AND THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

The annual meeting of the National Council for the Social Studies and a joint meeting with the National Council of Geography Teachers will be held in Milwaukee, Wisconsin, November 22, 23, 24, 1945. Headquarters will be at the Schroeder Hotel. On Friday, November 23, there will be three joint sessions. The program for these sessions is as follows:

Geography in the High School

9:00-10:30

Chairman: Clyde Kohn, Northwestern University
Panel: Alice Foster, University of Chicago
J. Granville Jensen, Rhode Island College of Education
J. H. Bradley, formerly of the University of Southern California
Harry Lathrop, Illinois State Normal University
A. H. Meyer, Valparaiso University
Zoe Thralls, University of Pittsburgh
Lee West, Colorado State College of Education
Secretary: Leavelva Bradbury, State Teachers College, Oshkosh, Wisconsin

Civilization as a Problem in Geography

12:30-2:15

Luncheon
Chairman: Eric Faigle, Syracuse University
Speaker: Charles C. Colby, University of Chicago. "Civilization as a Problem in Geography"
Discussion: George J. Miller, State Teachers College, Mankato, Minnesota
Secretary: Christine Hahn, Roosevelt Junior High School, Milwaukee

Geography in the Air Age

2:30-4:00

Chairman: George J. Miller, State Teachers College, Mankato, Minnesota
Speakers: Guy-Harold Smith, Ohio State University. "Caught Mapping: Old Maps and New in the Air Age"
Robert Platt, University of Chicago. "World Air Routes"
Discussion:
Secretary: Mary Jo Read, State Teachers College, Milwaukee

At the General Session, Saturday morning, November 24, at 9:00, the speakers will be Mary G. Kelty, President of the National Council for the Social Studies, and Glenn T. Trewartha, Department of Geography, University of Wisconsin. Professor Trewartha's subject will be "Japan's Prospects, Geographically Considered."

Thruout the three-day session, every attempt has been made to emphasize the importance of geography in the social studies program. Wherever possible, geographers are being asked to assist, formally and informally, in the section discussions.

Many topics of vital interest to social studies teachers will be discussed during the three days. Among these topics are the following:

Teaching Citizenship in the Atomic Age
Geography in the High School
Supplementary Materials for Teachers and Pupils
The United Nations Organization in the Curriculum
Civilization as a Problem in Geography
The Dilemma of the Peacemakers

The fact that these meetings are being held in Milwaukee provides an unusual opportunity for teachers of the Middle West to attend this annual meeting. You will find the subject matter presented of real value to you, and meeting with others interested in your work will be an inspiration.

EDITORIAL NOTES AND NEWS

Ramie, well-known Chinese fiber crop, is being successfully grown in southern Florida and is reported to be adapted to slightly acid soils in the Everglades and along the Gulf Coast. The strong, silky fibers are beaten out in decorticating plants, and the objectionable gum removed by degumming machines. The fibers are woven into textiles, ropes, and packings of various types. Propagation starts from four-inch-long root sections planted in rows. Harvest usually follows in ten weeks. The first cutting may be left to help fertilize the land. Barring frost there may be four cuttings a year. This perennial plant restocks itself repeatedly and requires little or no cultivation. Ramie is cut and tied in bundles when it attains a height of five to seven feet by machines similar to hemp harvesters. Juicy tops and leaves may be used for cattle feed. The processing of the dried ramie is similar to that of other plant fibers.

Earl B. Shaw, Teachers College, Wooster, Massachusetts; Major William C. Cunningham, University of Pennsylvania; Captain Robert W. Finley, University of Wisconsin; and George H. Primmer, Duluth State Teachers College are on the geography staff of the Army University Center No. 1. This information is taken from the Shrivenham Post, Vol. 1, No. 1, the publication of the University. The center is near Swindon, England. According to the Post, the AUC No. 1 opened with an enrollment of 3660 students. The Center was founded to offer an opportunity to enlisted men and women to take short instructional courses at college level, schedule cultural tours to various points of interest, and provide training for competitive sports and varied forms of civilian recreation.

Growing fresh vegetables on soilless, desert islands is of added interest these days as our armed forces are occupying islands strategically located along various air and ocean routes. Typical of such gardening practices is that used on Ascension, an island used as a British cable station and also a base for bombers and transport planes. The vegetables are rooted in long, narrow beds carved out of the barren rock which covers most of the island. As there is practically no rain, fresh water is obtained from distilling sea water. The beds are irrigated with this water to which is added the soluble mineral salts needed for plant growth. The water drained from the gravel-lined beds is recovered for future irrigations. The vegetables so grown are chiefly lettuce, cucumbers, tomatoes, peppers, and radishes to relieve the monotony of the canned and packaged food. Part of the beds are protected from the hot noonday sun by a coverage of white cotton cloth similar to that afforded some tobacco fields. Fences break the force of the constant trade winds. Bees needed for the pollination of the tomatoes and cucumbers were flown in from Brazil more than a thousand miles distant. The hydroponic gardening as it is called is getting wide publicity because of its possibilities of supplying fresh vegetables to the staff stationed on some of the key bases along the route of our transoceanic airways.

Columbia's American School of the Air broadcasts have been shifted to an afternoon hour, Monday thru Friday. The staff of the school is headed by Leon Levine, Assistant Director of Education who will be guided by a National Advisory Board headed by Dr. William C. Bagley, editor of *School and Society*. One series of themes will be The Story of America, which traces the development of our life from a social and economic standpoint.

GEOGRAPHICAL PUBLICATIONS

Bernhard Haurwitz and James M. Austin. **Climatology.** xi and 410 pp., maps, ills., index. McGraw-Hill Book Company, New York and London, 1944.

George J. Brands. **Meteorology, A Practical Course in Weather.** viii and 335 pp., maps, ills., glossary, index. McGraw-Hill Book Company, New York and London, 1944.

The new text by meteorologists Haurwitz and Austin, originating in a course for aviation cadets, is now presented as "an introduction to climatology for the student of meteorology." In its organization and content, the book differs in no material respect from the other recent climatological texts which have presumably been addressed to geographical students. Part "A," General Climatology, successively considers the topics of solar radiation, temperature, wind, and pressure, hydrometers (moisture elements), air masses, climatic zones and types and their identification in the symbols of Koeppen. New to books in this field is a concluding chapter in this part on "microclimatology," long overdue for textual presentation. The eight chapters in Part "A" carry a slightly heavier charge of meteorology than do corresponding chapters in other texts, but the restraint shown in this respect is remarkable. Part "B" of the text is Regional Climatology, in which each continent as well as the oceanic world is discussed according to physical features, mean distribution of pressure and wind, ocean currents, air masses, fronts, and climatic zones. As in other texts, the essentials of Thornthwaite's classification are discussed, only to be abandoned in favor of Koeppen's.

The Haurwitz-Austin text has every appearance of being an able work, dull in spots to be sure, but that is no new feature of a climatology. It does not help us, however, in solving the growing problem of climatology as a course of study in the liberal arts curriculum. The future of climatology, long a standard course in geography departments, is decidedly uncertain. If the textbook writers are correct in interpreting climatology as this and nothing more, then the subject properly belongs in the offerings of institutes of technology. A broadly conceived text in which the author courageously generalizes at the risk of error would return climatology to its earlier distinction as a subject of cultural merit and thus suitable for presentation by geographers for geographers.

The purpose of Brands' text is "to meet the needs of those who require a special knowledge of meteorology because of their interest and responsibility in the application of weather information." The sixteen lessons, covering basic knowledge required of employees of a well-known airline, necessarily consider such topics as winds, icing on aircraft, storm types and forecasting, water vapor and moisture. Analyses of the elements of weather are limited to practical applications, and properly so for a handbook of this sort. Probably sound in its meteorology, the work includes a few errors in climatological details. For example, the sirocco is identified as a foehn-type wind and described as one that "blows down the slopes of the mountains in southern France and Italy." It is of interest to note that both these texts speak confidently of monsoons, a term which some authorities are abandoning because says, E. H. G. Dobby, it "has become the woolliest in Asiatic geography."

RALPH H. BROWN

University of Minnesota

Reinhold Paul Wolff. **Miami Economic Pattern of a Resort Area.** 172 pp.; table of contents, annex, charts. University of Miami, 1945.

In a short preface B. F. Ashe, president of the University of Miami points out: "This publication has grown out of a series of studies that the author has undertaken in connection with the work of the Post-War Planning Commission at the University of Miami. A committee formed by the Chamber of Commerce has laid the foundation for the planning work which at present is performed by the Dade County Coordinating and Planning Committee."

The viewpoint of the book is economic and for that reason five of the six chapters which deal with the tourist trade, trades, industries, real estate, and income structure are well-treated. The first chapter, however, which deals with South Florida's resources, displays a very limited and inadequate understanding of the natural environment.

Numerous simple pictorial charts and diagrams are scattered thruout the text, whereas thirty-five of the forty on statistical tables are included in an annex along with footnotes and definitions. It seems incredible, however, that any attempt at planning, even of the most rapidly growing city in America, could be satisfactorily completed without a well-executed and comprehensible map of the city and its immediate environs.

JOHN H. GARLAND

University of Illinois

John H. Bradley. **World Geography,** Ginn and Company, 486 pages, maps pictures, charts and diagrams, Boston, 1945. **$2.48**

Owing to the lack of geographically trained secondary-school teachers, the geography that will be taught in our high schools in this, the postwar era, will depend to a large degree on the textbooks now being published. Fortunately for the field of geography, and for secondary-school students, *World Geography,* by John H. Bradley, provides not only a mass of geographic information, but also valuable training in the techniques of thinking geographically about world problems. The material is presented dynamically, and not as a catalog of dead and disconnected statistics. The author has one important aim in mind: to lead students to an understanding of the world-wide geographic forces which have come to play so vital a rôle in the life of man. The book stresses those interregional and international connections which make for good will and well-being amongst nations.

World Geography is concerned with human geography from beginning to end. The natural conditions of the world are considered principally in terms of their functional value. The author searches for the relationships between the things man does and the natural conditions of the regions in which he does them. In presenting such ecological relationships, however, the author guards against becoming an environmental determinist. He keeps insisting thruout that "the use that men make of the earth may be determined more by cultural than by natural influences."

The book is divided into six units, each of which treats of the world as a whole. The first four present world patterns of the elements of the natural environment, and in turn treat of Geography in the Modern World (1 chapter), Man and Climate (7 chapters), Man and the Surface of the Land (2 chapters), Man and the Natural Resources (3 chapters). Unit V presents the outstanding world patterns created by man, including patterns of occupations, trade, and circulation. Unit VI deals with the world patterns of nations, and treats of their political geography. In this unit, chapters are devoted to The British Empire, Nations of the European Peninsula, the Soviet Union, Nations of the Far East, the South American Republics, and the United States and Its Neighbors.

The teaching aides of *World Geography* are varied, sound, and stimulating. Each chapter ends with a dozen or more statements wholly or partially false to be corrected by students, with questions for discussion, things to do, and books to read.

A great advantage of the text lies in the freshness of its presentation of geography to secondary school students. Sentences are colorful, vigorous, and clear. The author has written directly and simply, yet not condescendingly. Technical words are explained when they are introduced.

The book includes many charts, diagrams, and pictures of high geographic quality. It contains enough maps to make a good sized atlas. Erwin Raisz and Richard E. Harrison have contributed some of their best work to the text. The maps are not only artistic but illustrate the text and carry out the objective of the book as well.

The ideas presented by the author should do much to foster an understanding of the fundamental interdependence of all places and peoples the world over.

CLYDE F. KOHN

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